REMARKS

Claim 20 is new. Support for new claim 20 may be found in lines 3-18.

Claims 1-20 remain pending in the application.

Applicant acknowledges with appreciation the indicated allowable subject matter of claims 4-19.

Claims 1-3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over STINESSEN US 5,398,762 ("STINESSEN") in view of GROB et al. US 6,464,469 ("GROB"). This rejection is respectfully traversed.

STINESSEN is offered for teaching a subsea gas compressor. The Official Action recognizes that STINESSEN does not include at least one shaft supported by magnetic bearings controlled by a control unit placed externally of the pressure housings.

GROB is offered for teaching a turbocompressor including magnetic bearings controlled by a control unit placed externally of the pressure housings.

The position of the Official Action is that one would have been motivated to modify the structure of STINESSEN with the elements of GROB because magnetic bearings are known to provide a more efficient means of supporting a shaft compared to oil-lubricated bearings.

However, GROB does not teach these elements for use with a subsea gas compressor, as disclosed by STINESSEN.

GROB, in connection with FIG. 4, describes the compressors in the following manner (see, e.g., column 8, line 31 to 44):

> "In addition a regulation apparatus 17 is illustrated in FIG. 4 which serves at least for the control of the electromagnetic radial bearings 5 and of the motor 2. Sensors 16a, 16b, 16c, 16d which measure the position of the entire shaft 13 or, respectively, of the partial shafts 2a, 3a relative to the radial bearings 5 are arranged in the region of the radial bearings 5, with the sensors 16a, 16b, 16c, 16d being connected via electric lines 16e, 16f, 16g, 16h to the regulation apparatus 17. Electric lines 15a, 15b, 15c, 15d which are connected to the regulation apparatus 17 are provided for controlling the magnetic coils of the radial bearings 5. In addition an electric line 15e is provided which connects the regulation apparatus to the windings of the electric motor 2 via non-illustrated power electronic circuitry."

As is understood by the above description, the common regulation apparatus for the magnetic bearings and the magnetic bearings is typical for a non-subsea design in which this common regulating apparatus for bearings and motor is arranged in a cabinet.

For a subsea integrated compressor and motor with magnetic bearings the challenge has been to develop a regulating apparatus for the magnetic bearings and connect this apparatus to the bearings inside the compressor and motor in a proper way by wire connections or subsea mateable connectors, e.g., as recited in the present independent claims 1 and 20.

Thus, one of ordinary skill in the art would have been discouraged from combining the features of a subsea compressor with a regulating apparatus of a non-subsea design.

Indeed, applicant has worked on this development for several years, and it was a breakthrough when realized that, to simplify the challenge, it was necessary to reduce the complexity by separating the regulating apparatus for the magnetic bearings from the other regulating functions, e.g., the motor, and placing the regulating apparatus in a pressure housing filled by inert gas close to the compressor and motor. See, e.g., as recited in new claim 20.

Briefly stated, independent claims 1 and 20 describe the steps leading from the surface to the seabed for the regulating apparatus (e.g., as explained in the present specification beginning at page 2, line 3):

> "The subsea gas compressor according to the present invention is characterised in that said at least one shaft is supported by magnetic bearings controlled by a control unit situated outside said pressure housing and connected to said bearings by wire connections or subsea mateable connectors. This involves said bearings are placed inside the pressure housing of the compressor module, whereas the electronics and electric components of the magnetic bearings are situated inside separate pressure housing close to the compressor module. This pressure housing is filled by an inert gas, typically nitrogen, or an inert liquid, and have an inside pressure in the range of one bar, or in the range that the electronic components can tolerate. There are a significant number of wires between the housing for the magnetic bearing electronics and the compressor module housing. These wires supply the magnetic bearings with magnetization current, as well

> as transmit signals from sensors of the magnetic bearings to the control electronics in the pressure housing for the magnetic bearings electronics. Special penetrators through the walls of the pressure housings prevent ingress of seawater. The wires between the pressure housing of the electronics and the compressor module can either be connected with Subsea mateable connectors, or can be connected dry".

The present application is the national phase of international application of WO 2005/003512 A1, prepared in January 2005. The international application is the first published description of a subsea control system for magnetic bearings of a subsea compressor with motor, and the publication includes the features to provide for a control system being able to work. At the time when preparing this publication it was both daring and a significant modification compared to the more general wording of GROB. This is underscored by the efforts, time and costs it has taken for Kvaerner Oilfield Products AS (now renamed Aker Solutions ASA) to design, build and test to qualify said control system with wires, penetrators and connector - a work that is still ongoing.

Due to the necessity of very high frequency and short response time of the regulation, the electronics and electrical components are, per the present specification at page 2, lines 7-8, "placed inside separate pressure housing close to the compressor module". Consequently, it is essential to locate this separate housing outside but subsea and close to the compressor and its motor. For this reason, the separate housing is

pressurized with an inert gas and special penetrators in the walls of both the pressure housing for the compressor and motor, as well as the separate pressure housing for control unit, prevent the ingress of seawater, e.g., as recited in claim 20. Other control functions can be placed on surface and at a considerable distance and from the compressor and motor, e.g. on a production platform or at shore.

Thus, it is readily apparent that to even approach the claimed invention, a considerable amount of modification of the typical onshore common "cabinet" described by GROB would have been required.

Therefore, claims 1-3 and new claim 20 are not rendered obvious by the proposed combination, and withdrawal of the rejection is respectfully requested.

In view of the foregoing remarks, as well as new claim 20, the application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis is respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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